Title Controlled-atmosphere related disorders of fruits and vegetables

Author Robert K. Prange and John M. DeLong

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Abstract

Purpose of review: The primary purpose of this review is to document the array of controlled atmosphere (CA)-related disorders that have been reported in literature for all fruits and vegetables. The possible biochemical and biophysical bases for these disorders will also be discussed for specific disorders.

Findings: CA-related disorders can be grouped into three categories: 1) Disorders that occur in air storage that are alleviated by CA; 2) Disorders that occur in air storage that are aggravated by CA; and 3) Disorders that are not known to occur or rarely occur in air storage and are induced by CA. Methods for avoiding disorders that are aggravated or induced by CA are discussed in the final section of the review. The number of CA-related disorders continues to increase as more fruits and vegetables are subjected to CA storage experimentally or commercially. Within many species, the occurrence of CA-related disorders can be influenced by the cultivar and how, when and where it is produced. In addition, there is evidence that the presence or absence of a particular disorder can depend on apparently subtle changes in other factors, such as the time between harvest and CA, storage temperature, O_2 and CO_2 concentrations, CA duration and the time following removal from CA.

Limitations/implications: Predicting the occurrence of CA-related disorders remains a challenge as does non-destructive detection of CA-related internal disorders. In addition, some of the disorder descriptions are only explained with text (no photographs), which can lead to duplicate names for the same disorder. Thus, some disorders with different names may be variations of the same disorder.

Directions for future research: In recent years, intense research on several specific CA-related disorders has resulted in a number of models being proposed to explain how these disorders are affected by CA. To date, there is no consensus on any particular model and future research should focus on validation or improvement of these models.